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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/463,643	05/01/2000	SHUJI NAKAMURA	NICHIA-00700	6608

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 06/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/463,643

Applicant(s)
Nakamura et al.

Examiner
B. William Baumeister

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2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Mar 25, 2002
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-30 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 12, 15 6) ☐ Other: _____

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DETAILED ACTION

Claim Objections

1. Claims 19 and 20-30--as they depend from claim 19--are objected to because of the following informalities: Claim 19, last line, recites that "the n-type contact layer has a carrier density of more than 3×10^{-3} ohm-cm." The examiner provisionally interprets the claim language in light of the specification and prosecution history to intend to read "the n-type contact layer has a resistivity of less than 8×10^{-3} ohm-cm." Appropriate correction is required to confirm this interpretation.

Allowable Subject Matter

2. The indicated allowability of claims now numbered as 18 and 19 is withdrawn in view of the newly discovered reference(s) to Itaya et al. '017. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 U.S.C. § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

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The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 18-21, 24-27 and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Itaya '017 (supplied in IDS # 12). See FIG 19 and the associated discussion at col. 24: The n-contact comprises three layers of (1) a first n-type contact layer composed of AlGa_N doped 1E18; (2) a superlattice, second n-type contact 24 composed of 50 angstrom Ga_N doped 8E18 and 50 angstrom AlGa_N doped 5E18; and (3) a third n-type contact layer 23 composed of AlGa_N doped 1E18. Itaya discloses that this superlattice structure produces a 2DEG that lowers the contact resistance (col. 24, lines 41-52). Further, as Applicant explains in the specification that the carrier concentration (or dopant concentration) produces the resultant resistivity in the superlattice that is set forth in claim 19, the Itaya structure also necessarily has a resistivity that satisfies the resistivity limitation of claim 19.

Claim Rejections - 35 U.S.C. § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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6. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itaya as applied to claims 18 and 19 above, and further in view of JP '082. Itaya teaches all of the limitations of the independent claims but teaches a mod-doped heterojunction instead of a mod-doped homojunction superlattice. JP '082 teaches n+/undoped homojunction superlattices having thicknesses on the order of less than 100 angstroms provided for the purpose of providing a high carrier concentration and increased speed (English Abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to have substituted a mod-doped homojunction as taught by JP '082 for the mod-doped heterojunction superlattice of Itaya for various purposes such as to simplify the manufacturing process by only requiring binary GaN for the base composition of the entire superlattice region to thereby provide a better lattice-matched junction and improve the crystalinity.

7. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itaya '017 as applied to the claims above, and further in view of Bruno '604 (previously made of record in the prior Office Action). Itaya teaches all of the limitations of base claim 26, but discloses that the GaN well is more highly doped than the AlGa_N barrier--opposite to the doping cited in claim 28. Bruno teaches that (Al)Ga_N superlattices can be mod-doped such that the barrier layer is more highly doped than that of the well for the purpose of reducing scattering and increasing mobility. It would have been obvious to one of ordinary skill in the art at the time of the invention to have provided a mod-doped superlattice in the LED of Itaya wherein the barriers are more heavily

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doped as taught by Bruno for the purpose of reducing scattering and increasing mobility/reducing resistance as taught by Bruno.

8. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itaya as applied to claim 21 above, and further in view of Ohba et al. '466 (supplied in IDS #15). Itaya teaches all of the limitations of claim 21 as set forth above, but does not anticipate claim 30 because the third contact layer is composed of AlGaInN instead of InGaInN.

a. Ohba teaches GaN light emitters wherein n-GaInN layers (55/56) are interposed between the GaN contact layer 54 and the AlGaInN clad layer 57 (see e.g., FIGs 6-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to have further employed within the Itaya emitter a GaInN layer for the purpose of providing better lattice matching and reducing defects as taught by Ohba (see e.g., col. 10).

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1, 15 and 17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 8 of copending Application No. 09/534,503. Although the conflicting claims are not identical, they are not patentably distinct from each other because the present claims are broader than claim 8 of the '503 application since claim 8 possesses, *inter alia*, all of the limitations of the recited claims of the present application. It would have been obvious to one of ordinary skill in the art at the time of the invention to make a III-N light emitter having at least the three-layer n-contact structure since it has been held that the omission of an element and its function in a combination where the remaining elements perform the same function as before involves only routine skill in the art. *In re Karlson*, 136 USPQ 184.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

11. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 12/19/2001 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP §

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609(B)(2)(i). Applicant is reminded of the extension of time policy as set forth in 37 CFR

1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

INFORMATION ON HOW TO CONTACT THE USPTO

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at **(703) 306-9165**. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



B. William Baumeister
Patent Examiner, Art Unit 2815
May 30, 2002

EDDIE LEE
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